The Moonshot Phenomenon in the Business World

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Abstract. This paper reviews basic and emerging research trends on the moonshot phenomenon in the business world. It traces the emergence and development of the nuances for this construct, its relationships with the proclaimed corporate culture and some new attributes of management by objectives. Nevertheless the numerous realizations that the moonshot phenomenon has acquired – as goals, projects, tasks, specific leadership, skill and others, it seems subordinated to certain principles and approaches, constituting the so called moonshot thinking that is also succinctly described.

Keywords. Moonshot, corporate culture, proclaimed corporate culture, strategic management, exponential organizations.

1. Introduction

It is generally accepted that the term "moonshot" officially came into being at a joint session of Congress of the United States of America on 25ᵗʰ of May 1961 through a speech, delivered by the president John F. Kennedy, i.e. "this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth" [1, 2, 15]. The principles of business administration imply that "the goal", formulated and communicated by Kennedy incarnates a "bold statement", grounded on "engineering expertise and insight", information about USSR's achievements and capabilities as the main competitor, and understanding NASA's team capabilities [3]. It is evident that the first application of the moonshot appears to be in the state administration. But management evolution has proved numerous times that many new management constructs, theories, methods, etc. are transposed later from the state administration (the military and other agencies) to the business world. That is why the purpose of this paper is to review and identify diverse realizations of the moonshot phenomenon in the business world. Since the moonshot phenomenon acquires new realizations in another societal sphere, it adds up new shades to its meaning, too. In such situation the academic publications (books and articles), describing this transition, turn out to be few. That is why blogs by opinion and business leaders and corporate websites are also reviewed to delve deeper into the specificity of the existence and evolution of the moonshot.

2. Transposing the moonshot as a goal for the business organization

The contemporary view to the theory of management by objectives permits defining the moonshot goal as an effective and efficient means of achieving the massive transformative purpose, formulated and pursued by the leaders and sometimes other constituencies of the business organization [4, 5, 6]. In particular the moonshot goal may be determined as an "ambitious", business goal that should be achieved within the next 5-10 years that categorizes it as a long-term one [5, 6]. It is strongly associated only with "the most game-changing

disruptive innovations" and related geographically with a global center for high technology and innovation – as the Silicon Valley in the United States of America [7]. Palao [5] implies its belonging to the aggregate of the proclaimed culture elements by emphasizing its inseparable connectivity and high congruence not only with the massive transformative purpose, but also with other official corporate documents as purpose, mission, vision, and organizational values. In its turn AQAL Group [17] preserve the hierarchical order between the massive transformative purpose and the moonshot, but present them as key inventories of the organizational manifesto – another proclaimed culture company document that may be created by the senior leadership and may attract diverse constituencies to the campaign of its realization. So, the moonshot goal receives triple realization within the set of proclaimed culture elements – first, an element, subordinated to the massive transformative purpose [4, 9], second – as an element, subordinated to the manifesto [17], and third - as an independent element with a rank, equal to the other items in the aforementioned set [12, 15].

It is worth considering the view of "Company X" – an exponential subsidiary of Alphabet that seems to be the initial driver of the transposition for the moonshot from the state administration to the business sector. This subsidiary uses the content approach to define the semantic area of the moonshot goal as "an intersection of three ingredients" [8], proposed by Eric "Astro" Teller – the first director of the subsidiary, also nicknamed as "Captain of Moonshots", as follows:

- The existence of a huge world problem, making an impact on the survival or the quality of life for millions or billions of people that should be identified by organizational leaders.

- The emergence of a radical, science-fiction based, potential solution to the aforementioned problem that even may even seem unrealizable at the present moment.

- The recent advent of a technological breakthrough, supporting leaders' hope that the realization of the aforementioned solution may become possible in the period of 5-10 years.

General approach of formulating a moonshot, consisting in five phases, is proposed by Diamandis [4]. Other variants of moonshot design approach exist, too – rendering the necessary phases to three [9] or introducing different values for chosen time measures [10] (see table 1).

Table 1. Approaches to design process of the moonshot

Steps	Diamandis's approach	SMExO community's approach	Johnson's approach	Minkowski's approach
1	Prepare a concise description of the organizational 5 year moonshot, using clear language, being impartial and specific in dates and numbers.	Formulate your organizational 5-year Moonshot.	Formulate your organizational moonshot (no end terms mentioned).	Choose a challenge for the company: (a) from the outside, i.e. (a Sustainable Development Goal) or (b) an internal goal for the company. Describe why it matters to the entity (motivation, exploration sphere, identified opportunities).

Steps	Diamandis's approach	SMExO community's approach	Johnson's approach	Minkowski's approach
2	Formulate a specific, measurable objective for the first year, embodying the first real action to achieve your moonshot.	Formulate a specific objective you can achieve this year that is intended to put your moonshot on schedule.	"What needs to happen in the next 3 months, for that to be true in 6 months?"	Select a technology in order to articulate the potential moonshot. Explore technology's second generation effect as a potential solution for the moonshot. This technology should trigger exponential growth for the entity.
3	Identify initiatives and actions that can be undertaken in the next 30 days to test and minimize the risk of your 1-5 year moonshot and objectives (ideas).	Formulate 3 specific sub-objectives you may achieve this month that are expected to put your one-year objective on schedule.	What needs to happen in the next month for that to be true in 3 months?	Develop a design question, e.g. "How might we solve world poverty by providing access to free, autonomous transportation to everyone?"
4	Search for evidence, supporting the achievability of your organizational moonshot.			Generate bold ideas to cope with the design question.
5	Identify a concrete action that may be undertaken at the moment to make immediate progress. It should be performed within the next one hour.			Formulate the organizational moonshot by means of discussion with peers.
Sources: [4, 9, 10, 16].				

The moonshot goal may also be described by means of its characteristics, identified by business leaders and researchers (table 2). Some of these characteristics are accompanied by succinct descriptions, while others are only presented by means of the respective labels.

Table 2. The characteristics of the moonshot

Author	Described characteristics
Diamandis [4]	- wonderful, beautiful, inspiring, poetic, beautiful, - occupying the role of "world unifier", - filled with "great technical challenges" and - related with numerous manifestations of true heroism

Author	Described characteristics
Jain and Schroeter [11]	- crazy - avoidance of competition, - associated with high risk - occupying the role of catalyst for frequent changes (pivots) in "all ground rules" - "smashing all existing paradigms" in the business and regarding the pursued strategies
Berman [12]	- wildly ambitious
Rockwell [13]	- mobilizing followers' efforts - engaging followers emotionally and rationally - build on the successes already achieved, but without repeating them - a catalyzer of numerous iterations and continuous adaptation - touching followers' lives
van der Pol [14]	- attracting and retaining great talent
X company [8]	- not always grounded on science or technology breakthrough
Anthony, Johnson [18]	- inspiring – stimulating people to perform at extraordinary high levels. - credible – grounded on detailed assessments of underlying technological trends that have to ensure to some extent its achievability. - imaginative – embedding „a meaningful break from the past".
Skibba [27]	- high reliability of the necessary resources (funding) - expressed public support (in and outside the company)

Most of the business organizations possess the ability (resources, time, and efforts) to pursue only a single moonshot goal with the exception of the mighty multinational companies (holding companies, conglomerates) that may contribute in numerous spheres through their diverse strategic units [14].

3. Other realizations for the moonshot

In addition to the moonshot goals a wide range of realizations for the moonshot phenomenon in the business sector exist. Some of them are directly targeted to the organizational setting, while others impact higher-rank systems (industries, regions, nations). Some of the main realizations for the moonshot phenomenon, based on the adopted approach to management, are, as follows:

- According to the process approach: (a) the term moonshot entered the business lexicon as shorthand for "a difficult or expensive task, the outcome of which is expected to have great significance" [18]; (b) taking into account the stance, occupied by Eric "Astro" Teller who emphasizes the act of moonshotting, describing it as "namely attacking a clearly defined problem through a radical solution supported by practical scientific data for huge upside potential" [22].

- Through the lens of the project-based management the moonshot represents: (a) an extraordinary project or proposal that fulfil three criteria, i.e. addressing a big problem, proposing a radical solution and utilizing innovative thinking and technology [6]. A six step plan is proposed to accomplish the moonshot project (table 3); (b) "risky, time-consuming

ventures" and/or "visionary projects", outlining the cherished company's development direction by the senior leaders, the ways in which the company may "get there", and constituting the workload of the most talented employees for long periods. The moonshot projects are required to align with the elements of the proclaimed culture as mission and values, as well as the pursued goals by the core company [19]; (c) "extremely ambitious project or mission" - i.e. an assignment, "undertaken to achieve a monumental goal" in order to solve the biggest societal issues and strengthen the resilience of business organizations, whole industries and the economy as a whole [23]; (d) a moonshot initiative, defined as "a novel, unexpected, ambitious, difficult, and risky mission" (e.g. an assignment), planned to exceed "the known limits" through disruptive innovations [25]. It is also depicted the image of the successful moonshot from this perspective - communicated imaginatively but simply, embedding the right mix of vision, framing, leadership, and team excellence.

Table 3. The plan for accomplishment of moonshot project

Steps	Description
1. Identify the huge problem	Generate great ideas
2. Assessing the high potential to overcome the huge problem	Mission impossible perspective
3. Create a project team of necessary experts.	Committed, motivated, collaborative people
4. Identify most difficult aspect of the project.	First, plan and perform the work activities, needed for the completion of the hardest part of the project.
5. Foster a growth mindset among the team members.	Failures should be viewed as the main source of learning and celebration events.
6. Actively searching for buy-in to the project at every level of your business organization.	
7. Fast implementation of the plan should follow.	
Source: [6].	

- The product management perspective creates another useful realization for the moonshot phenomenon within the organizational setting (a startup or an exponential subsidiary of big company). It is developed by means of creative adoption of agile and lean principles of management within prescribed sets of respective steps, i.e.: (a) the moonshot is described as a new product manager's skill [20] – design of "moonshot vision", defined as creating "an ambitious, groundbreaking"…"clear and compelling"… "product vision", associated with a specific set of steps to be followed by the product design teams and senior leaders in the companies, pursuing accelerated growth in these uncertain and disruptive times. (b) other set of steps is proposed for the achievement of "moonshot effect", specifying its unique deliverables as public beta or minimum viable product [21].

- The moonshot phenomenon may even accept the shape of great challenge to contemporary companies, not only struggling for their survival, but also striving for operational excellence and sustainable development, i.e.: (a) moonshot—a game-changing challenge that creates high performance teams, elevates leaders and catapults careers [21]; (b) the moonshot is perceived as "a huge, seemingly unachievable challenge" by Richard Branson – a globally famous entrepreneur [11, in the forward].

- The moonshot phenomenon manifestations may be assessed from leadership perspective, bringing to the forth cherished characteristics of the moonshot leaders and identification of common elements of moonshot leadership (table 4) [25].

Table 4. Leadership perspective of the moonshot phenomenon

Nuances	Description
1. Characteristics of moonshot leaders [25]	1.1. Future-oriented (Futurists), envisaging big ideas. 1.2. Entrepreneurial (Impact-drivers), opting for radical solutions with massive impact on companies and humans. 1.3. Adopting technologies (Technologists), experimenting with technology. 1.4. Oriented to innovations (Innovators), bringing ideas to life.
2. Elements of moonshot leadership [25]	2.1. Identifying a big issue to solve. 2.2. Searching for a radical solution. 2.3. Relying on disruptive technologies. 2.4. Oriented to intensive teamwork, extraordinary actions in daily work and unbelievable achievements. 2.5. Overcoming psychological barriers as (self-)doubts and lack of intent.
3. The traits of the person who pursues a moonshot [11]	3.1. "A mindset of abundance, sustained by possibility thinking, imagination and curiosity." 3.2. Strong desire to improve the lives of millions or even billions of people. 3.3. Sense of wonder. 3.4. "Courage to ask big, daring "what if" questions – even "crazy" questions".

- The change management perspective to the analyzed phenomenon has created the derivative construct of "moonshot transformation", described as an array of undertaken strategic moves by business organizations [26], as for example: (a) Designing not only new products or services, but also developing radical technologies with potentially great impact on company's mission; (b) The moonshot pursuit should be confined in a separate division away from the core activities of the company, doomed to pursuing of fast return on investments, in order to decrease the tensions and sharp contradictions between – on one hand, long-term versus short-term orientation in the completion of the undertakings, and non-profit driven versus for-profit oriented activities – on the other hand. (c) Providing the choice for the employees and other constituencies (e.g. clients) how to interact (work) with the company, i.e. by their physical presence in the office (on the site), entirely virtually or in a mixed way (hybrid), if and when it is possible. (d) Implementing mass customization through the use of exponential technologies (e.g. providing personalized academic education through artificial intelligence).

- The creativity perspective reveals the realization for the moonshot phenomenon as "a (crazy) idea" or "moonshot idea", supported by a specific design exercise [28, 29].

- The innovation perspective brings to the emergence of the term "moonshot innovation", equivocally described as "a wishful thinking" or business reality that both impose on the organizational leaders and employees the "painstaking task" of first searching for "the right questions" and after that starting to find clever answers for them [31].

- The practical side of revealing the essence of moonshot through provided specific examples constitutes another interesting realization for the moonshot phenomenon in business organizations. Two main streams may be identified here: (a) further specifying the massive transformative purpose by scope, depth and/or planning horizons (time) [4, 9, 15]; (b) using the same examples as those, proposed for the massive transformative purpose without taking into account the potential existence of the last one and any relationships with it [12, 30].

4. Principles and approaches underlying Moonshot thinking

The richness of realizations for the moonshot phenomenon in the business world is directed by stable and emerging principles of moonshot thinking, elaborated predominantly through the experience of Company X – a subsidiary of Alphabet, led successfully to exponential growth by its first director Eric "Astro" Teller. This entity officially proposes its own definition for "Moonshot thinking" as "pursuing things that sound undoable, but if done, could redefine humanity" [8]. Thus, the intersection sphere among the encountered and wisely chosen huge problems, affecting the lives of billions of people, the associated with them radical solutions and the breakthrough technologies attracts the attention of business leaders and diverse constituencies, striving to sustain business success and increase the organizational growth exponentially. The systematic efforts in this direction by the leaders of the aforementioned subsidiary brought to the creation of "a place where the processes and culture make it easier to make radical breakthroughs – repeatedly", i.e. a "moonshot factory" which performance at satisfactory levels is ensured by adhering to a set of guiding principles [8], as follows:

- The preference of aiming for 10X, not the incremental 10% in order to cope with exponentiating contemporary challenges and even anticipate them, create passion among the pursuers of the respective moonshot, gain freedom to change basic assumptions (i.e. all ground rules), search for and find out unexpected answers within the semantic area, locked between audacity, creativity and science fiction. This means deliberate and continuous prioritization of innovative behavior that may bring in the success not only in big and small companies, but also in the state administration. So, culture matters, especially the creation of innovation culture.

- Falling in love with the problem – identifying reasons and influencing factors, searching new approaches to solve the respective problem and assuming that technology is just a means to find the best solution.

- Communicating the real world (surveying public opinion or natural conditions) as early and as possible in order to identify disadvantages of the proposed solution and potential corrective actions.

- Increasing creativity in the company through structuring of diverse teams with members, originating from various communities, cultures, and professions in order to be able to present, challenge, defend and even partially accept mutually their unique stances and together generate better ideas through discussions and consensus.

- Prioritizing the work on the hardest, most important part of the problem and postponing, if possible, the completion of the necessary relatively simple tasks. Thus the speed of organizational (team) learning increases, regarding this problem, so decision-makers can sooner decide whether to persevere further or to redirect their efforts, resources and time to other bright ideas. Team culture development and long-term commitment constitute the two great managerial challenges here.

- Adopting of failure learning approach that requires the creation of specific organizational (team) culture, characterized by psychological safety for failing employees and managers, accepting failures as learning opportunities (lessons), and attributing them with the

same prestige as celebrating successes. Thus, the audacity, demonstrated among team members, increases and change resistance diminishes.

- Occupying the role of a chaos pilot who: (a) embraces the uncertainty, (b) perceives the unknown as an advantageous opportunity and a source of creative energy.

- Learning to love the first prototype ("version 0. crap" or"v0.crap") – the earliest, scrappiest version of the deliverable (product, service, process) that may provide the team with honest and open feedback in order to further elaborate and iterate their ideas by experimentation.

- Shifting perspective. The solution of big problems is not always complex and expensive, because changing held basic assumptions, regarding them and the creative use of multidisciplinary approach may generate results that greatly exceed the expectations.

- Adhering to the long-term view on the undertaken initiatives, ensuring intrepidity and tranquility, regarding necessary explorations, experiments, risks and audacious ideas.

Furthermore, the image of the "the moonshot thinking factory" that is expected to retain the success in the business organizations may be determined and monitored by multiple answering a number of questions [10], as follows:

- What are the involved constituencies? (departments, skills and expertise, insiders and outsiders)

- "What are they solving for?"

- "When and where do people meet?"

- "What is the reason people give for attending?"

- How is the momentum kept?

- How can it be detected that people's mindsets are changing?

The crisis management perspective also gives birth to another principle of moonshot thinking, describing it as a mixture of three complex ingredients - courage, resourcefulness and experience, contributing to better decision-making in business organizations in times of diverse crises (table 5) [24]. Even contributions of moonshot thinking to tackle some of the issues during the Covid-19 pandemic were identified, raising its status to an innovation driver, producing results in surprising ways [41].

Table 5. The three ingredients of moonshot thinking

Complex ingredient	Description
Courage	Reliance on intuition. Mutual trust among team members. Making decisions together and sharing the responsibility. Open communication environment and appreciation of diverse opinions. Believing in the positive outcome.
Resourcefulness	Building a plan on the decision when it needs to be made. Include all the team members in the potential solution of the problem. Relying on the best judgments, regarding the challenges. Communicating clearly, minimizing distractions. Focusing on what currently works (performs) well. Orientation to the efficient use of resources. Performing multi-perspective monitoring of the current situation. Initially working on multiple possible options and after that making a swift decision which one to follow, based on succinct discussion. Thinking all the time in options.

Complex ingredient	Description
Experience	Preliminary developing workarounds and procedures based on simulations of probable failures and finding appropriate solutions. All these serve as a sound base of experience to upgrade during a crisis. Performing reflection and learning session immediately after the end of the crisis.
Source: [24].	

The moonshot thinking is also associated with two other modern management approaches, as follows:

- Future-back planning that is used first to determine the future state of the respective business organization (or an entire industry) and after that directing the managers' attention backwards to the current moment in order to create actionable milestones. In this way the business organizations generate growth simultaneously from two sources – on one hand, the extension of the lifespan for the current core business activities for the company, and on the other hand, continuous identification and seizure of the new growth opportunities of tomorrow [32, 33].

- Infinite learning as a part of moonshot thinking brings forth organizational agility, resilience and exponential growth orientation through reassessing the impacts of the current exponential technologies, social and market changes, frequently going outside leader's and employee's comfort zone, regarding problems, challenges beliefs and basic assumptions in order to transform the company in a timely manner or even before the emergence of certain events in the business environment [34, 35, 36, 37].

5. The new attributes of Management by objectives and another related construct as reverberations of the moonshot phenomenon

The moonshot phenomenon is revealed by means of comparing several semantically related constructs. The first two of them represent the newness in the management by objectives as massive transformative purpose and big hairy audacious goals. The loonshot represents another related construct to the moonshot phenomenon, i.e. an idea (table 6).

Table 6. Semantically close constructs to the moonshot

Attributes	Description
Moonshot [38]	1. "An ambitious and expensive goal, widely expected to have great significance." 2. An effective and efficient means of achieving the massive transformative purpose. 3. Its formulation is based on future-back planning. 4. It should be achieved in the next 5-10 years. 5. Receiving the support by organizational leaders since its start until it is achieved or definitely abandoned in a timely manner.

Attributes	Description
Massive transformative purpose [39]	1. "The higher, aspirational purpose of the organization" or sincerely, confidently and officially expressed, shared, high generalized, corporate aspirations "to accomplish near-miracles" in order to win the "hearts and minds - imaginations and ambitions" of all constituencies, especially the external ones. 2. Strongly supported by organizational leaders.
Loonshots [38]	1. The most important ideas, projects or breakthroughs that do not realize seamlessly in terms of support, funding, recognition, etc. 2. These are accompanied by long periods of expressed skepticism, uncertainty, crush, ridicule or neglect and their champions are often considered crazy or even fired by their employers or abandoned by their sponsors. 3. But later on these recovered to transform into paradigm shifting innovations.
Big hairy audacious goals [40]	1. A long-term goal that is understood and supported by all personnel members in the business organizations. It engages, mobilizes and unites the people. 2. Present-future planning guides the formulation of the Big hairy audacious goals. 3. Sustainably supported by organizational leaders.

Thus, certain specifics of the moonshot phenomenon are identified and outlined: (a) the existence of potential hierarchical dependence among its realizations (i.e. between some of the constructs), (b) different attitudes of organizational leaders, regarding the provided support of its realizations, (c) simultaneous use of two directions of planning in the business organizations (i.e. present – future; future - back).

6. Conclusion

This review clearly shows the availability of great diversity in the stances on the moonshot phenomenon, occupied by company constituencies that justifies the identified and critically analyzed, numerous realizations. Corporate survival could not be sustained and organizational leadership positions could not be conquered and retained in the contemporary fast-changing, volatile, uncertain, complex and ambiguous business environment without realizing persistent pursuit of crazy ideas to solve the biggest problems of humanity, striving for a better world by creating the future and struggling for it through participation in deep transformations of societies and industries, creating extremely high value-added for the constituencies, attracting and engaging the best talent and solving a number of intermediate issues while iterating along the way of achieving your moonshot. That is why the design and implementation of moonshots in succeeding business organizations, no matter their embedded meanings (as specific goals, projects, tasks, specific leadership, skill and others) has become an indispensable part of the contemporary strategic management process and the official expressing of the intentions by the senior leaders.

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